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COMBINED MONTHLY REPORT
BRANCH OF RESEARCH

FOREST EXPERIMENT STATIONS
DENDROLOGY
FOREST PRODUCTS
FOREST ECONOMICS
GRAZING RESEARCH

JUN 1926

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COMBINED MONTHLY REPORT

BRANCH OF RESEARCH

June, 1926

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WHAT MONTHLY REPORTS SHOULD INCLUDE

E. H. Clapp

The purpose of the Monthly Reports in the Branch of Research is primarily to furnish current information on progress and developments in investigative work to (a) the Chief of the Branch and Chiefs of the responsible offices; (b) the research personnel of the entire Branch; and (c) the administrative organization of the Service. Without reports such information would become available much more slowly. The information should be stimulating to the entire Research personnel and should permit more effective administration and coordination of our research. It should make results available promptly for application in NF administration, should aid in the more effective handling of the physical resources of the National Forests, and in fact should help to sell technical forestry and the research which must be a necessary part of it.

To accomplish these purposes the Monthly Reports should include:

(a) Brief statements of progress in investigative work where there is something significant or interesting which might not otherwise be made available for a long time.

(b) Similar brief statements where there is something of significance or interest to report on such subjects as new or improved investigative technique which might stimulate the development of research in general.

(c) Brief statements on important or significant trends in forestry even though there may not be a very direct connection with the research programs. Information of this character might not otherwise become generally known at all.

(d) References to the routine phases of the work, such as announcements of visitors and assignments of men, where such references can be given significance in some larger or more important way. A mere catalogue of movements of the Research staff should be avoided.

Wherever advisable, statements even though very brief may appear under the names of the men who prepared them.

What in general is needed is research progress explained in the light of its larger significance and the more important forestry developments in their relationships to research, rather than small matters of routine or the movements of personnel. Reports should be made interesting and stimulating so that they will be read.

YOUR LIBRARY AND MINE
Helen E. Stockbridge

Books and Periodicals in Washington Library

There were added to the library during the fiscal year 1925/26, 707 books and pamphlets, bringing the total number now on the shelves up to 25335. Besides the books, the library files 89 current periodicals, in which the important articles on forestry, lumbering and allied subjects are indexed by authors and subjects, for the card catalogue. About as many more journals are loaned to the Service from the main library of the Department of Agriculture for circulating among the offices interested, and for indexing in the Service library, whose catalogue contains cards for a large number of books and articles not actually on file here. The librarian indexed 3081 books and articles last year.

Use of Library

During the year 11045 books and periodicals were loaned, and there were 1495 visits to the library by members of the Service and others. The largest number of loans from the library in a single month was 1169, in March 1926, while the greatest number of visitors in one month was 156, in June 1926. The change cards show that there were 146 borrowers of books last year, and 71 members of the Service to whom current periodicals were circulated regularly. The Department Library furnished us 428 books for reference, and the Library of Congress and other sources furnished us with 131 books on call.

Bibliographies

The library continues to issue a monthly list of the books and articles indexed, which is still published in the Journal of Forestry. The "Complete List of Forest Service Publications" was revised this year to include everything issued up to December 1, 1925, and the selected list of "Books on Forestry in English" was enlarged and remimeographed on Feb. 1, 1926. The latter was published in the 1926 edition of the Forestry Almanac, issued by the American Tree Association.

The following subjects have been covered by short bibliographies during the year:

Balsa wood
Brush disposal
Communal forests
Famous trees
Forest ecology (selected references)
Forest surveys
Game in the national forests
Swamps and swamp vegetation

Field Libraries

To relieve the Washington library of some of its routine, the records of all field libraries charged to the western district foresters, national forests and experiment stations, were transferred last fall to the district offices concerned. The Washington library still keeps the records of books in the Forest Products Laboratory, and the eastern national forests and forest experiment stations. There are now 1317 books charged to the laboratory, 1639 to the District 7 (eastern district) national forests, and 640 to the four eastern forest experiment stations.

A small library is to be maintained for a few years at New Haven, for the use of the recently established forest taxation inquiry under Prof. Fairchild of Yale University. About forty books have been sent so far, and others are to follow in the near future.

Chinese Chestnuts

The testing of untried chestnuts for their resistance to the bark disease and their adaptability for growth in the United States, particularly where our chestnut grows, is being continued through the cordial cooperation of the Office of Foreign Seed and Plant Introduction (Bureau of Plant Industry).

Castanopsis delavayi is a large straight timber chestnut, 80 feet in height and 2 or 3 feet in diameter, recently found by the Department's Plant Explorer, Dr. Rock, only in the Province of Yunnan, China, where it grows on the summits of limestone ridges at elevations of from 8,000 to 8,200 feet. Dr. Rock judged it to be one of the hardiest timber trees in the region. However, without accurate data regarding meteorological conditions in Yunnan, it is impossible to predict in what sections of the United States this chestnut is likely to succeed. Trial alone can settle the question.

In 1925 a trial planting was made of about 200 seedlings by the Appalachian Experiment Station. The seedlings used were raised at Bell, Md. The trees were planted on several different sites and heavily mulched as a winter protection, but by spring they had all succumbed. This result would seem to show conclusively that Castanopsis delavayi is entirely unsuited to the climatic conditions of the southern Appalachians and further tests need not be given to it there.

Further Trials in Milder Regions.--Inasmuch as there is still an available supply of Castanopsis delavayi for experimental planting, steps are being taken now to arrange for plantings in milder parts of the country.

Cooperation is being arranged with the Florida State Agricultural Experiment Station, the plantation to be made in the region of the Everglades, and possibly also in central Florida. Another trial is to be made in the California Coast Redwood region in the vicinity of Ft. Bragg, through the courtesy of the Union Lumber Company, and similarly at Scotia, California, through the kindness of the Pacific Lumber Company. Some 200 trees are to be set out at these two stations. Arrangements with these California people were very generously undertaken by David T. Mason, whose helpful interest in this problem is greatly appreciated. The Pacific Northwest Forest Experiment Station is also to try some 200 seedlings at the Wind River Station this fall.

The chances are that Castanopsis delavayi will succeed at these Pacific Coast stations because of the existence in the Northwest of a native species of Castanopsis which would seem to indicate a regional adaptation of this group.

Arrangements have not been completed, but possibly the Southern Forest Experiment Station may induce the Great Southern Lumber Company to put in a trial plantation of Castanopsis delavayi in western Louisiana in the region of Bogalusa, where it is believed this species is likely to succeed.

Castanea mollissima.--This species, a true chestnut usually known as the Chinese woolly chestnut, has been grown by the Bureau of Plant Industry for some twelve years now at the Bell, Md., station, and it has shown unquestionable ability to resist the chestnut bark disease. Nearly all of the original plantation there is apparently unaffected. Climatically it appears perfectly adapted and the indications are that it will continue to grow vigorously.

Prof. J. H. Reisner, University of Nanking, China, collected a supply of seed in 1921, and from this stock a considerable number of thrifty seedlings were reared at the Bell nursery. During the spring of 1926 the Office of Foreign Seed and Plant Introduction kindly turned over to the Forest Service a sufficient number of seedlings to plant at two stations one and one-half acres. An aggregate of one-half an acre was set out by the Appalachian Experiment Station, and one acre was planted in a pure stand at Letchworth Park. Both of these plantations are well within our native chestnut range where the trees will be severely tested by the bark disease.

It is too soon to say how successfully Castanea mollissima will meet the test of disease and show proper fitness for growth under the soil and climatic conditions where our native chestnut has lived and died. The past season's growth in our plantations has not revealed the presence of disease and the growth of the trees has also been satisfactory.

At the Bell station, it is noted that some of the seedlings show a slight variability in their resistance to the bark disease, but apparently none of the young trees succumb to the disease, as do seedlings from so-called immune survivors of our native chestnut.

Before his death Dr. Van Fleet produced a thoroughly blight-free hybrid chestnut by crossing Castanea mollissima and our native Castanea pumila. The fruit of this hybrid is sweet and larger than that of our native chestnut. This hybrid is likely to be of great importance as an orchard chestnut, because it can be multiplied abundantly by budding and grafting. But ~~propagation~~ because hybrid nuts cannot be depended upon as a means of propagation, this new chestnut is not likely to be of service as a forest tree.--G.B.S.

FOREST EXPERIMENT STATIONS

Foreword

"An Editor's First Aid to Young Writers"

(From the Literary Digest Book Review)

Learning to write for publication often resembles war in one painful respect: it involves wounds and what lawyers call mental anguish. To the beginner, scarred by the rejection of his manuscripts, there seems to be a conspiracy against new writers. "You have to be famous before you can get your stuff published," he wails, "and you can't be famous until you have had something accepted. What are we to do?"

The problem is by no means simple, yet it can be solved, as may be seen in William H. Royce's article, "How Balzac Wrested Fame from Failure," which appears in the April INTERNATIONAL BOOK REVIEW, and which tells for the first time the full story of Balzac's youthful tragedy, "Cromwell." After sixteen months' labor in a Paris garret, this first product of his pen had brought him nothing but jeers and rejection. His parents thought their argument against a literary career was won, but the future novelist calmly replied, "Tragedies are not in my line, that is all." An author he still would be. "He forthwith began to write a series of penny-dreadfuls, to get, as he said, his hand in for the composition of novels. What his ultimate success was," adds Mr. Royce, "and how he became the greatest novelist of France, all the world knows."

But first aid for the would-be writer may be found nearer home. The same issue contains an interview with George Horace Lorimer, editor of THE SATURDAY EVENING POST, the hope of thousands of strugglers after fame, who "feel that they could do much better than anyone who is writing for that periodical at present if they could only attract his attention." So, on behalf of this mute and as yet inglorious army, Miss Helen Louise Walker asked him what young writers must do to achieve their ambition.

"Learning to write is more difficult, perhaps, than learning other professions," said Mr. Lorimer, "because it is a lonely process. The thing most young writers fail to realize is that they must serve an apprenticeship. To be a doctor or a lawyer one must also serve an apprenticeship, but it is less painful because it is laid out along prescribed lines. The young student of medicine must have years of training at school. Then he becomes an interne and finally starts out bo build up a practice for himself - which is a long, arduous proceeding.

"The same thing is true, in a way, of the young writer, except that no one can teach him to write. He must teach himself. Of course, he can take one or more of the many excellent training courses for authors, but these do not teach him how to write. They can only prescribe courses of reading, which will prove beneficial and give him certain fundamentals. The most important thing he has to do is to learn how to use the English language. He must make himself a master of words, and that he can achieve only with much practice in writing. Then, when he has learned how to express himself, provided always that he has something to say, he is ready to begin.

"The best thing for the would-be author to do is to take a position on a newspaper. The training he receives there is invaluable. He learns to write every day about what he sees. He learns what it means to have his stuff cut and harried and changed beyond recognition, and he learns why it is so changed. And all the time he is getting practice in writing. He is learning the use of words and is developing an individual style.

"He begins to write for magazines, and he sends out things which promptly come back to him. Now, the difference between learning to write and learning other professions comes here. When a young doctor begins to practice, he does not consider it a personal affront if people do not come to him at once. He tells himself that he is not well known as yet. He has not made enough acquaintances. But the young writer who creates something - a story, a poem, an article - has put something of himself into it. He draws upon his very soul for his material. And when it comes back to him with a printed slip of rejection, he cannot help feeling that it is a reflection upon himself. This is natural. There is a feeling of hurt, however sensible he may be, which affects him deeply. Writing is, after all, the expression of one's ego, and the ego is a sensitive affair which is easily wounded.

"There may be years of discouragement and endeavor, which do not seem to lead him anywhere; and the thing he does not realize is that these painful years are the period of his apprenticeship - the time when he is learning the lessons he will have to know before he really can write."

Sometimes a young author sends a story to an editor and asks for a frank criticism. To such requests Mr. Lorimer replies that an editor cannot conduct a school of journalism, and that it would not be valuable if he did. "What the young writer wants," he says, "is not frank criticism, but praise - which won't do him any good." There seems to be a point, however, where Mr. Lorimer relents, for he continues:

"When we get a manuscript which we think shows promise, we try to get in touch with the writer. If possible, we send a man to see him. We talk the thing over with him and make suggestions. We try to help him to develop his own talent. For, despite impressions to the contrary, we welcome new writers. We want the fresh point of view of the young person. It is like injecting new blood into an old body.

"The public is not made up of fools. It is as enthusiastic over the good work of an unknown author as it is over that of the man with a big name. Big names sell stories, of course. That is because the public has liked some previous work of the well-known man and looks for something as good again. But if his work falls below the standard he has set for himself, if it does not measure up to what the public has learned to expect from him, it is worse for him - and for us - than if he had been an unknown, because there is the element of disappointment.

"The public knows a good thing when it sees it. Never doubt that. Therefore, the young writer who has something to say and who has learned through years of practice how to say it, is always more than welcome. Moreover, we feel that it reflects credit on us to discover new talent.

"My advice to the young writer is this: Serve your apprenticeship, knowing it for what it is. Learn all you can about life, about men and women, about history and the affairs of the world, about literature and the conflict of ideas. Learn to think. Make yourself a master of words. Develop your individual style. Then, when you are ready, if you have anything to say, you will find your market."

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Washington

Legislation

Congress finally adjourned on July 3 after a rather long and strenuous session. On July 2 the House passed both the Ohio Valley and Middle Atlantic Forest Experiment Station bills introduced by Senators Fess of Ohio and Reed of Pennsylvania, and they were signed the same day by the President. These bills provide for an authorization of $30,000 each to establish the new stations, and it is possible that Congress will provide the necessary funds for the actual physical establishment of these institutions at its next session. When these are a fact, the forest experiment station program, as far as the United States proper is concerned, will be complete. Every forest region of the country will now be served by a forest experiment station, though it is realized that none of the stations are yet in a position to undertake the full programs that they should be working upon. The Rocky Mountain group of stations are, of course, far below the other stations in personnel and funds. Could we put these on the same basis as those of the other stations it would be indeed a source of gratification.

There yet remain two forest experiment stations necessary for the real completion of the entire program,- a station for Alaska and a station for the tropics, particularly the West Indies. A bill for the latter introduced in the House at this session by Representative Davila failed to be reported out of Committee. Similarly, two other bills for existing experiment stations failed to obtain recognition. One provided $50,000 for the Northern Rocky Mountain Station and one provided a like amount for the expansion of the naval stores work.

The present Congress has been very liberal as far as the experiment stations have been concerned. Congress approved, when it considered the Agricultural Appropriation Bill, an item in the Forest Service section providing an appropriation of $30,000 for the California Forest Experiment Station being established this year. In the Senate an increase of $18,000 was added to the general item for the Appalachian Station. Thus this year we have increased the total amount available for experiment station work by practically $48,000. We, however, suffered a cut of $20 due to the fact that last year our allotment for silvicultural work ended with the odd $20. This fiscal year we attain the quarter million mark for silvical investigations.

General Office

The exodus from Washington is beginning. Because of the dearth of funds during the closing part of the fiscal year just finished, it was impossible for those in Washington to leave, consequently shortly after the first of July Reineke is leaving for the Northern Rocky Mountain Station where he will assist the Station in its western white pine growth and yield study. Mr. Clapp, after completing the revision of his manuscript on forest research, is leaving for the western stations and Districts. Munns plans on several short trips during the summer until Mr. Clapp returns to Washington.

Forest Measurements

The usual summer vacation period of the effice force in Forest Measurements is beginning and a number of the people in the section are now taking their annual leave.

Shortly after the first of July it is planned to install in Washington a new and more up-to-date tabulating machine that we may be able to turn out more work than before, and to do things that have been impossible with the present equipment. An order has also been placed with the company to procure a faster sorting machine which will speed up our work in that respect. This will not be available until late this fall as the company is so far behind in filling its orders. It is believed that the replacement of our present equipment and the substitution of these new machines will speed up our work between 10 and 25 per cent. During the past fiscal year about 500,000 cards were used in our various lines of work, and three people employed continuously.

First Requirements Report Issued

The first of the series of 14 requirements reports dealing with the California pine region was issued early in the month. The plan followed for this publication to get a thorough distribution used both regular lists and return post cards. Department stencil lists were used

to distribute copies to the Forest Service, foreign foresters, State foresters, forest schools, public libraries, and individuals in similar interested organizations. District 5 had built up a mailing list of something over 10,000 names to which copies were sent in hand-addressed envelopes, together with a letter from Col. Greeley. This list, made up largely of California people, included timberland owners and operators, and those interested in forestry, such as scientists, school teachers, legislators, county and State officials. To supplement this distribution, 40,000 post cards were sent out on mailing lists obtained from different sources, as the California Development Association, various other local business and commercial organizations, the California Agricultural Experiment Station list, retail and wholesale lumbermen, contractors and architects, and wood-using industries. Full returns have not yet been received but indications are that better than one in eight will result before the final distribution has been completed. A special envelope was printed for the distribution of this report and all envelopes hand addressed in Washington using spare time within the Service. Approximately a year's time intervened between the first development of plans for distribution and the actual physical accomplishment. Returns have indicated that this has not been too long a time in view of the very thorough way in which the distribution has been made, the coordination of work on the part of many people involved, and the systematic way in which the bulletin has been distributed. It is not too early now in other regions to consider ways and means of reaching the audience for whom these reports are prepared.

Forest Ecologist Examination

About 30 people took the examination for the three grades of forest ecologist, about half that number finding a place on the register, the failures being due to insufficient educational qualifications to meet the standards established by the examination. It was indeed surprising to find so few foresters took the examination in spite of the fact that a definite effort was made to interest a large number. The greater number of those on the register are in the associate grade.

Swedish Foresters

Early in the month Prof. Tor Jonson and F. Johansson, his secretary, and a member of the Swedish Forest School faculty, visited Washington and made definite plans for visiting a number of forestry centers. During July Dr. Jonson is making a swing around the west, visiting, as he returns to New York, the Forest Products Laboratory. Later he plans on visiting the eastern stations. Dr. Jonson was very much interested in our statistical work and showed keen interest in the new mensuration methods. He indicated considerable surprise at the extent of the numerous forest types, and the exceeding complexity of our conditions. Although familiar with much of our work, he has not been personally familiar with American conditions and looks forward to his trip with much

interest. Dr. Jonson is anxious to bring about a closer correlation of work between this country and Sweden, particularly in investigative work. He is leaving the forest school to take Dr. Schotte's place as head of the Swedish Forest Experiment Station.

After nine months study at Yale University, C. F. Korstian finished, in June, his dissertation on "Factors Controlling Germination and Early Survival in Quercus." He was rewarded by receiving a Ph. D. degree. Before leaving New Haven, Korstian spent two days with Messrs. Marshall, Eliason, and Gill, of the Office of Forest Pathology, showing them the areas and sample plots on which the natural replacement of chestnut was studied in 1924. Korstian noted considerable further advance in natural replacement since that time. In company with W. O. Filley, Forester of the Connecticut Agricultural Experiment Station, the Station's plantations near Rainbow, Conn., were visited. Some of these have been out for 20 years or longer. The Station welcomed Korstian back to Asheville on the 30th.

The staff was further increased during June by the transfer of junior range examiner A. F. Hough from District 5. Just at the end of the month Professor L. J. Young, of the University of Michigan, and I. H. Sims, newly appointed junior forester, arrived to take up work with field parties.

The Bent Creek field laboratory was finished under McCarthy's direction. Further improvements to the grounds have been mapped out and will be made during the summer.

Frothingham spent a week in West Virginia in search of places for studies of natural reproduction on cut-over areas. On this trip Frothingham visited A. B. Brooks, chief game protector, and P. M. Browning, chief firewarden, at Buckhannon, Supervisor C. L. Perkins at Elkins, and T. H. Clagett, Chief Engineer of the Pocahontas Coal and Coke Company, at Bluefield. Through the courtesy of Messrs. Brooks and Browning an automobile trip to the Senaca State Forest, in Pocahontas County, was taken.

At Bluefield, Mr. Clagett organized a 100-mile automobile trip through the lands of the Pocahontas Coal and Coke Company. District firewarden Karr was a member of the party. Continuous forest production is important in this region as an adjunct of coal mining, and for many years the forest has been variously used and abused to supply mine timbers. Special reason for studies of reproduction and growth is therefore presented.

The report of the forest type committee of the local section of the Society of American Foresters was sent to the Journal of Forestry for publication. Three of the Station's staff are members of the committee.

Through the death of Dr. George R. Lyman, Dean of the College of Agriculture, Morgantown, W. Va., the Appalachian Forest Research Council lost one of its esteemed members. Dr. Lyman died at Baltimore, on June 7.

Fire Damage Study

The results of the fire damage study to date were written up by McCarthy for publication and plans were prepared for further field work during the present summer. These plans include two specific phases: a study of some of the severe summer fires, and a further study of damage to hardwoods in relation to size.

Last year's extreme drought brought about some fires in the late summer which were of unusual severity and extent for this season of the year. These burned areas will be examined by the same methods that have been previously used on other fires. The damage to hardwoods will probably be more severe than is found in spring and fall fires.

One outcome of the fire damage study for this region is the determination, by records from a number of fires, of the proportionate damage to various sizes of hardwoods. Enough acreage was examined to give comparatively smooth curves of the percentage killed in eleven cases. Fires of different severity were represented. The curves of the percentage killed in fires of different severity were correlated, and a general diagram was constructed to show percentage killed, based both on severity of fire and size of trees. From this a formula has been devised which it is thought will make possible conversion of damage in one size class into terms of any other size class. The purpose of part of this summer's work is to test and if possible prove the practicability of this method of expressing the severity of a fire and of determining the damage.

Oak Study

Through the courtesy of the State Forester of Ohio, the State Forester of Maryland, and Professor R. C. Hawley, more than 1,500 measurements of second-growth oak suitable for volume table construction have been furnished the Station. A part of the season will be spent in getting other measurements for volume and growth in oak and in measuring additional yield plots.

Drought Study

Haasis examined the plots which he established at Bent Creek last fall to observe the effect on hardwood trees of the summer drought of 1925. Most of the trees which lost their leaves early last fall are growing again this year, but many have dead tops. Some are sending out basal sprouts, while on others the only green branches are of this year's growth, coming out from the trunk, sometimes near the bottom of the tree, sometimes all along the bole. Some of the suppressed trees have been released by the death of the large overshadowing tops and are now making good growth.

Last fall the soil down to a depth of a foot had dried out to a moisture content of 5 to 10 per cent. This spring it is mostly between 15 and 30 per cent. The main root layer in this locality is very shallow. There are few roots and little humus below a depth of about a foot. Sometimes the bed rock is within a foot or two of the surface.

This season a good many ornamental pines, hemlocks, and spruces are dying in Asheville. The station has received many calls to examine the victims and all the members of the staff have been called on for examinations. The trouble seems to be largely a question of the droughts of last summer and this spring. In some cases the drought alone seems to have been the cause of death. In other cases, bark lice, bark wounds, or competition with neighboring trees were undoubtedly contributing factors. Some trees have only a few small dead twigs; others have an entire dead top. Bark lice are unusually plentiful on white pine this year, and are apparently the cause of the death of small branches.

Forest Insect Investigations

Dr. F. C. Craighead spent the first week in June at the Bent Creek laboratory going over the season's work with Beal, Daughton, and St. George.

Several new insectaries have been erected in which to rear bark beetles and borers which are associated with the pine trees used in the various projects.

Dr. A. G. Boving of the Bureau of Entomology, Washington, D. C., spent part of June at the laboratory working out phases of the biology of bark beetles and their predators that were associated with trees used in the experimental work. Some very interesting records and materials were obtained.

St. George spent the last week of the month at the Eastern Field Station, East Falls Church, Va., working on some pine and larch defoliating experiments.

Numbering Permanent Sample Plots

The inquiries sent out in February showed a general consensus in favor of a system of plot numbering by single numerical series for all plots in a single locality. This conforms with the opinions of most of the members of the staff, and has been adopted. For a given locality the number is all that is necessary for identification, although the project symbol will also be attached.

Southern

General

Messrs. St. George and Beale of the Bureau of Entomology visited the New Orleans office on their way to their bark beetle experiments near Bogalusa.

Mr. Murrell Talbot, of the Bureau of Animal Industry, spent a day in New Orleans discussing methods of making detailed grass studies applicable to our McNeill grazing project. He was accompanied to McNeill by Hadley, where the problem was discussed with Agronomist Reed, who is handling the grass work of the project.

Mr. N. T. Barron visited the office to get growth and yield information to use on lands of the Dierks Lumber Company in Arkansas.

Naval Stores

The chipping, dipping, and weighing of gum during May and June required practically all of the time of Wyman and his two student assistants with some help from other members of the staff. Forbes joined Wyman and Wakeley at the Starke Branch Station on June 6. The naval stores work during his stay at Starke consisted of obtaining individual tree descriptions and statistical analysis of data accumulated. MacKinney is having his troubles with some of the meteorological instruments used in the study of climate as affecting gum flow, but with Wyman's help is gradually evolving methods of handling this pioneer work. This is the first time, so far as we know, that oleoresin has ever been collected in an automatic rain gauge.

Forestation

Hadley spent two days in Bogalusa going over the nursery seed beds, plantations, and all records with Student Assistant Chapman, before the latter's departure. Chapman has given us six months of excellent work requiring painstaking detail on our forestation projects.

Protection, Others

An interesting girdling disease, attended by the development of hypertrophied lenticels, was found on two-year-old slash pine seedlings that had one year in nursery and one year in field. Seedlings affected seemed to have died suddenly. Dr. Hartley of the Bureau of Plant Industry seemed uncertain as to whether hypertrophy and death were due to a fungus or physiological disturbance. Further investigations are to be made.

Lake States

The outstanding event during the month was starting our new branch station in the Upper Peninsula of Michigan. This was made possible through the generous support of the Michigan Conservation Department which placed $2,500 at the disposal of the Station for necessary construction and development. Mitchell and Wackerman spent most of the month blowing out stumps and clearing ground for our little laboratory and headquarters. Evidently, the pioneering days in the development of our experiment stations are not yet over.

Other field work was carried on on the Minnesota National Forest where a number of permanent sample plots were established. A survey of some forest swamp was made and some wells for measuring the water levels were located.

June also witnessed the arrival of the Forest Taxation Inquiry crowd consisting of Professor F. R. Fairchild, H. H. Chapman, R. C. Hall, and P. A. Herbert. They are all located at the Experiment Station.

Cloquet

Allison has spent much time checking the type maps made by the students. The maps are all being assembled and correlated to give a complete type map of the Station. The map showing the location of all experiments has been completed. Nearly all the estimates have all been worked up.

The wells for studying the water level in the swamp preparatory to draining have been installed under the direction of Mr. Neal of the Agricultural Engineering Division. Observations of the water level will be made at two-week intervals.

The heavy winds we have had this spring have caused quite a lot of sand drifting in the nursery, damaging the two-year-old beds.

The nursery seedbeds of this year's planting were in the nature of an extensive experiment in damping off, using some new materials recently developed for the control of this disease. Current observations of these beds have been made. An incipient attack of damping off was stopped by using a .25 per cent solution of uspulun.

A current growth study of the 1912 thinnings in a 37-year-old stand of jack pine has been made. The data have not been worked up completely; so far the figures show that the thinning did not stimulate the growth.

In cooperation with the Wood Conversion Company at Cloquet a thinning to secure small green popple for experimental work in making wall board in young aspen was made, the size of the material running from $\frac{1}{2}$ inch to 4 inches. Three plots were laid out in a stand of aspen 12 to 18 years old.

On each plot two 1/1000-acre reproduction plots were established, one stripped clear to the mineral soil and the other stirred to break the mat of leaves.

Northeastern

During the month Behre visited the 20-year-old permanent sample plots at Unionville, Connecticut, which were established for the purpose of marking the progress of the reproduction of white pine with seed trees following clear-cutting on a flat, portions of which were quite swampy. In the 20 years since logging, this area has become covered with a dense growth of gray birch, red maple, black cherry, white ash, red oak, white oak, and sugar maple, with white pine reproduction of all ages as an understory irregularly distributed over the area, and the wetter portions completely occupied by alder. The number of pine seedlings to the acre, estimated from a count of 16 square rods on each of two half-acre plots, was 1200 and 500 respectively - the plot with the smaller number having a relatively larger area of low wet ground. The plots were subdivided, and on half of each a release cutting was made, by which all the hardwood growth was removed except well-formed individuals of white ash, red oak, white oak, and sugar maple. The re-generation of this area has been slow, and planting would doubtless have accomplished the desired result much more promptly and produced trees of better quality. Although the reproduction on the ground, supplemented by what may be expected in the next few years and the hardwoods which are retained, will provide a new crop, it is going to be difficult to avoid producing a fairly large number of bushy, heavy, limbed trees because of the irregularity in size and distribution of the reproduction.

At Boston, Behre met Mr. Newlin of the Forest Products Laboratory for a conference on the mechanics of tree form. He secured some valuable ideas and suggestions on this matter from Mr. Newlin.

The plan for the establishment of permanent sample plots and the list of projects on which research is needed, prepared by Westveld, were distributed widely, copies being sent to all the agencies in the Northeast which are interested in research work. Projects were suggested which might be undertaken by timberland owners and pulp companies. Many favorable comments are being received.

Westveld spent two weeks during May and June on the White Mountain National Forest. Part of his time was spent on the methods-of-cutting plots on Cherry Mountain. He also spent several days in the Mad River Valley in search of a number of permanent sample plots established there by the Forest Service in 1906, and succeeded in relocating each one of the sets; the individual plots in some instances had been destroyed by subsequent logging operations. Most of the plots, however, are worth continuing, and Westveld plans to remeasure them during the present field season.

In response to a request from H. L. Bailey, entomologist for the Vermont Department of Agriculture, MacAloney met Mr. R. N. Marble at Woodstock and started him on the white pine weevil work. A remarkable freedom

from weevil exists in the pine plantations which were inspected. This work will be carried on in cooperation with the Bureau of Entomology throughout the summer months. The work in Massachusetts is progressing very favorably, particularly the studies of parasites.

Stickel spent the first half of June in the Adirondack Mountains, New York, getting the forest fire weather stations in operation. The stations at the New York State College of Forestry Summer Camp, Cranberry Lake, New York, will be continued by the College of Forestry under the direction of E. W. Gemmer. They are located in a mixed hardwoods type where the softwoods have been cut to a low diameter limit. One station is in a clear-cut area and the second in the standing timber. The forests around Elk Lake, New York, were selected as being typical of the forest land in the eastern half of the Adirondacks, and two stations were located on the land of the Finch-Pruyn Company. These stations are in the upper spruce type; one station being placed in the green timber and the second in a clearing. J. H. Weber will be in charge.

At the fire weather station in the white pine type, Petersham, Massachusetts, the data secured up to the present give some very interesting information. Relative humidities of as low as 25 per cent are very common, the lowest recorded being 15 per cent. The duff moisture percentage is also extremely low in this type during dry periods, the lowest recorded being $2\frac{1}{2}$ per cent each day. Much time is being devoted to studying the progressive drying out of the duff during dry periods. These records show that hitherto we have not given enough consideration to the heating effect of the sun on the duff. While it is true that relative humidity controls to a very marked degree the amount of moisture present, it is not until the sun's rays strike the duff and begin the baking process that the loss in duff moisture begins. Duff temperatures of as high as 120 to 135 degrees Fahrenheit are not uncommon. The rapidity with which the duff drys out in the early morning hours is also of great interest. Losses of as high as 10 per cent (beginning with an 8 a. m. reading of 18 per cent) have been found in less than one hour.

Northern Rocky Mountain

Although Weidman is still in the office trying to get his public requirements report in final shape for publication, the field work of the station is in full swing. Four field assistants have reported so far and a fifth is to report July 1. Field Assistants R. A. Chapman and E. I. Roe are to help Haig in the yield study and study of cut-over areas. A. A. Roemer is aiding in fire studies and making the tests and records at the station during Gisborne's absence. Field Assistant C. H. Huntington and L. M. Correll are to help Weidman and Kempff in the establishment of permanent sample plots in the methods of cutting and other studies. The assistants this year represent the forestry schools of Minnesota, Cornell, Montana, Idaho, and Iowa.

Gisborne started the season's work at the Priest River Branch Station, and visited fire-weather stations on the Flathead and Bitterroot Forests. Later he visited Spokane for a conference with the local Weather Bureau officials, as one of the members of this station has been assigned to the special fire-weather service, for which the Bureau has just been given an appropriation. As this man's activities will cover the territory of Montana and northern Idaho, Gisborne will cooperate closely with him.

Haig spent part of June reconnoitering for suitable stands for the yield study, and timber sale areas for the methods-of-cutting study. He conducted the cut-over area study on a white pine timber sale cut in 1911, and broadcast burned in 1912. Part of the area escaped fire, including some upon which seed groups were located although apparently not as many seed groups survived as would have been desirable for our purpose. The reproduction on this area is abundant and in excellent condition. In places on the burned-over ground western larch has attained a diameter of 4 inches and a height of 30 feet, with the white pine 2 to 3 inches in diameter and 15 to 20 feet high. This is an illustration of the favorable results that are sometimes found after hard, broadcast burning of the slash. More often broadcast burning results in very little or no reproduction in the western white pine type.

In addition to regular field assistants, Haig had the help, for five days on this work, of a junior forester from the Kaniksu Forest. The object was to familiarize the Forest man with our methods of cut-over-area study that he may conduct for the Kaniksu Forest the administrative studies of timber sale areas now called for on all the Forests by the District Forester. Haig is now near Prichard, on the Coeur d'Alene Forest, that he may be in a locality where there are numerous stands for the yield study, in anticipation of Reineke's temporary assignment to the station.

Laboratory work on the trees transplanted last spring has been completed, but two greenhouse tests are still active: a test of white pine seed, and a wilting test with yellow pine seedlings. In connection with planting, as well as fire studies, Wahlenberg is now obtaining readings from several weather instruments. In addition to the usual observations for the Weather Bureau, a daily report is made of duff moisture, evaporation, and minimum atmospheric humidity, for use in fire studies. Records of evaporation and soil temperature are being taken in connection with the study of establishment of planted stock under Ceanothus brush.

With the help of one, and sometimes two, field assistants during the latter part of the month, Kempff was able to do considerable field work in establishing permanent sample plots. During the recent two weeks' trip of the Idaho senior class in forestry to the experimental forest, four yield and two thinning plots were established. In connection with these six plots, there remained some work to be finished up by ourselves. It was largely on this that Kempff has been engaged.

An interesting comment on thinning experiments came from Messrs. Carter and Koch, who visited the experimental forest this month. They were very much pleased with our "so-called" Borggreve plot and the two plots of heavy thinnings from below which were recently put in to amplify the 1914 and 1919 series of thinning plots. All these plots are in our prevailing 70-year-old age class, and the Borggreve plot is the one from which a profitable thinning of about 9 M board feet an acre was removed and sold to a timber sale operator last winter. Mr. Carter and Mr. Koch suggested the need for some thinning plots in 40-60-year-old timber. This is already on our program, but is very low in order of priority.

Very satisfactory use was made in the sample plot work so far of the hypsometer plate which Kempff has designed and had manufactured for use on the new Forest Service Abney level. With this instrument it is possible to obtain tree heights and plot them on coordinate paper in the field in the same length of time required to tally distance and angle measurements for future computation and plotting. The advantage in doing this is that definitely sufficient data can be obtained for a strong curve with a minimum of height measurements before the party leaves the sample plot.

Among the visitors to the experiment station this month was Assistant Silviculturist Meyer, who stopped off for a day on his way to the Pacific Northwest Station. At the Priest River Branch the visitors included Messrs. E. E. Carter, Aldo Leopold, Elers Koch, and Lumberman Breen of the Kaniksu Forest.

Mr. E. R. Standford, Assistant Forester of Los Angeles County, California, stopped at Savenac Nursery between trains on June 18. He was particularly interested in the labor-saving devices of nursery work and in methods of conducting forestation experiments.

Rocky Mountain

Plans for June activity of Roeser and Bates in the Black Hills were changed rather suddenly when it was found that funds were not available to carry properly the expenses of the work. It was also thought inadvisable to attempt the work planned for the Black Hills, - which would have been essentially new work in brush disposal as related to fire hazards and silvicultural conditions, and in thinnings on a practical scale, - in view of the need for a comprehensive series of soil tests (T-5) to check up on what has been done in the past, which tests will require a great deal of attention until fully under way.

Bates was, therefore, very largely engaged with the soil study, making various tests preparatory to a comprehensive series of experiments, and developing the arrangements for cooperation with Prof. Rogers of Colorado Agricultural College. It has just about been decided that the greatest present values can be obtained by a series of tests of nutrient solutions in sand. After such tests have definitely shown whether the various species have different requirements for any or all of the nutrient elements, it will be much more simple to deal with natural soils and to recognize in them the chemical qualities which gave them their essential characteristics. Dealing originally with natural soils it will be very difficult to segregate chemical effects from the effects of different physical properties. Providing this plan is adopted, it will require the shipment of a considerable quantity of Nebraska sand to the Experiment Station and to Ft. Collins, where the tests will be duplicated. It is hoped to complete all of the arrangements so that the tests can be under way by September 1, to run for about a year.

Roeser was engaged during the earlier part of June with various activities, principal among which was the controlled pollination of some of the "Strain A" mistletoe-resistant yellow pines. Fortunately these bore a few cone flowers this year, and pollen ripened just in time so that the pollination could be performed before leaving for the Nebraska.

A test was started about June 18 with the peculiar soil found in Utah last July, to determine what properties of it cause it to be so favorable for yellow pine. It is known to be rich in calcium and magnesium sulphates. The tests were designed to show whether it encourages yellow pine solely through its nutrient properties, or through high water-holding capacity, or through some effect on root development which furnishes protection against drought.

After a check-up of District funds, about June 10, the District Forester was able to advance sufficient funds to enable Roeser and Bates to examine into the Nebraska conditions and to cover the natural pine territory from there to the Black Hills, as it had been planned to do in connection with the more extensive work in the Hills. After a few days spent at Halsey, the Station men were accompanied by Entomologist Baumhofer for 8 days' scouting in northern Nebraska, the Pine Ridge region of South

Dakota, and the Black Hills, during which time the prevalence of various pests was noted in each of the localities visited, and seed trees were selected, for future collections, which showed the greatest possible degree of resistance. The importance of seed source to the success of the Nebraska sand-hill planting may be gauged by the following conclusions, which, while put forth somewhat tentatively in the lack of complete technical data, it is believed will show the general situation.

1. The pine tip moth doing the greatest injury to the Halsey plantations is apparently present everywhere in the native pine from Halsey to the Black Hills. It is to be combatted by parasites and by selecting the yellow pine which shows the best adaptation to Halsey conditions and which will, therefore, most quickly "outgrow" the moth.

2. "Pitch tip" (the insect causing it has not been identified but is probably another tip moth) occurs on yellow pine from its southeastern limits in Nebraska to the Black Hills, apparently thriving best with the longest growing season as found near Halsey. While not yet noted at Halsey it is to be expected there, and should receive the same attention as the tip moth.

3. No evidence of immunity to either of these insects, in native pine, was secured, though some trees probably attract them more than others.

4. Peridermium, which appeared in such abundance a few years ago, causing much effort to be spent in pruning, occurs practically everywhere in the native yellow pine, and kills an occasional, especially susceptible tree. Other trees seem to be very definitely immune to it. While the danger of its doing serious damage at Halsey does not seem great enough to warrant the expense of pruning, there is no reason why it should not be almost completely eliminated by a process of selection, for seed and for trees, which we shall attempt in a full report to outline in detail.

5. While there is little reason to doubt that good clean yellow pine can be produced on the sand-hills, we are not so sanguine as formerly that the rapid growth of the species in early life promises the production of large or valuable timber. It is believed from the evidence secured on this trip that poles about 50 feet high can be produced in a short rotation, after which the trees will cease height growth and mature quite rapidly. No other species promises any better results, however.

Bates' work in July will be largely along the lines described with reference to the soils study. Both Bates and Ropper may put in a few days in establishing a demonstration plot in the Black Forest, where a very keen interest in management is developing among private owners of small tracts. At the Station the clearing of the north slope on the line of T-1 observation points will be one of the largest physical undertakings.

Pacific Northwest

June has been marked by activity in both field and office. The organization has been greatly strengthened by the arrival of Walter H. Meyer from the Northeastern Station. Mr. Meyer stopped en route west at the Lake States and Northern Rocky Mountain Stations and since arrival has been doing in the office the groundwork for his particular project of working out the technique of applying the new normal Douglas fir yield tables to irregular or understocked stands.

Our plans for field projects have been considerably disrupted by the loss of two of our four Field Assistants whom we had counted upon for the entire season. For a time it looked as though we would lose the other two also, one of whom had an offer from another Bureau at over twice what we are paying.

A new institution for us this month was a seminar for Forest School teachers on the new technique of yield and volume table preparation. Two sessions of two days each were held, at which McArdle explained the entire procedure followed in the preparation of the new Douglas fir yield tables, and some of the computations. The forest mensuration professors, of each of the three local forest schools, attended either one session or the other, as well as J. L. Alexander of the B. C. Forestry Branch and L. C. Merriam of Mason and Stevens. All seemed glad to get this first-hand explanation of the new mensurational methods.

About 100 copies of the set of new Douglas fir volume tables were sent out to a selected list, both inside and outside the Service.

Munger visited the forestry operations of the Long-Bell Lumber Co. with Capt. John Woods, their chief forester, and was impressed with the progress and extent of their artificial reforestation. Exceedingly successful plantations of redwood and Port Orford cedar were made this spring on land logged and burned last fall. The direct seeding appears to be very unsuccessful except perhaps for the small-seeded species. Their new nursery is showing its first crop of a million and a half seedlings and presenting the usual problems to overcome - moles, weeds, damping off, etc. This company is cutting a million feet a day, logging very close, and fortunately falling all snags over 12 feet high.

Isaac, with a field assistant, spent practically the entire month in the woods on the Douglas fir natural reproduction study. The Westfir germination and survival plots first received their periodic examination, after which a series of about 20 sample plots were established on each of seven different areas in the heart of the Douglas fir region on both sides of the lower Columbia River. The areas selected were on recent operations where accurate cutting and fire history could be obtained and where there was a clear-cut opportunity to study some phase of the reproduction problem. The phases covered include germination and survival with relation to site, cover, and season and intensity of burn, also the rate of establishment with relation to soil, exposure, cover, burns and source of seed.

The new plots were all placed on privately owned lands and it is gratifying to note that in every case the owners showed a keen interest in the work, willingly offering the use of their lands for our purposes and extending to us the courtesy of the use of their camps and transportation facilities. While at Vernonia, Isaac gave a talk at the Commercial Club luncheon on the work of the Station.

Dr. Raymond Kienholz of the University of Illinois who was with us last summer returned June 7 and has been on the natural reproduction study also. He spent the first two weeks at Wind River making the periodic study of the belt transect on the Wind River Lbr. Co. timber sale and installing some instrumental equipment to measure the physical factors on areas where germination should be taking place.

McArdle has been checking the new yield tables and writing various memoranda concerning methods used in this project to make the record clear and complete. He also put some time on the lightning study data, worked on plans for the fire studies for the season, and gave a radio talk in connection with Boys' Club work.

Westveld and Ritter examined 26 temporary and 5 semi-temporary sample plots on the yellow pine brush disposal study. The plots were about evenly divided between private and Government lands. The first two weeks were spent in the vicinity of Bend, Oregon. Ten days work was done on the Crater Forest and the last few days on the Klamath Indian Reservation.

There seems to be a distinct relation between the time of year that slash is cut and the rate at which the needles drop. Winter-logged slash loses its needles most readily, all of the needles usually having fallen at the end of two years. Slash created in the early spring is the slowest to lose its needles; in some cases 25% to 50% of the needles may still be attached to the twigs at the end of three to five years.

Simson at Wind River has been keeping up the current inflammability, static, and meteorological observations. On some smoking hazard experiments, he has been taking a series of simultaneous readings of relative humidity at different points in the vicinity of the Station. He also installed some meteorological instruments on Red Mountain and at Race Track Ranger Station. Simson gave short talks before the Columbia short-term protective force school on fire studies and on the technique of making weather observations, and their use.

Mr. Geneau, in charge of the Clarke-McNary nursery at Pullman, visited the nursery and Experiment Station, as did Prof. Haynes of the Oregon Institute of Technology. On the 27th, some one, probably a fisherman with a tobacco complex, was responsible for a nasty fire on lower Wind River that for a time threatened the Yacolt burn and points west. However, a quick get-away and some snappy work by the protective force held it down to about 40 acres.

Southwestern

Several yield plots were established during the month. Because of the uneven character of our yellow pine stands it has been necessary to devote much attention to selecting and laying out the plots. By adhering rigidly to the practice of running the boundary lines within groups, however, it is believed that the problem of securing normally stocked plots has been pretty well solved. Results thus far indicate normal yields of 40 to 50 thousand board feet in 150 years and as high as 100,000 board feet in 225 years. When we consider that our best cut-over stands are growing at the rate of only 100 feet annually, it becomes evident that they are only about one-third stocked.

An interesting and profitable trip was made with Dr. F. C. Craighead of the Bureau of Entomology over parts of the Coconino and Prescott. On the latter Forest considerable damage has been done by Ips in second growth stands. A recent finding that both Ips and Dendroctonus can be checked by exposing infested stems to strong sunlight without barking was confirmed on the Prescott. In a recent cutting to clear the right of way for a Forest Service road, the under side of all logs was found to be heavily infested mainly with Ips. Where the logs were shaded the upper side was also infested, but where they were lying in the sun practically all bark beetles on the exposed side were dead. Directions were given for exposing a large number of logs which have been cut during the past month.

The summer rains are approaching and although the precipitation has been light there has been nothing lacking in the usual electrical display. During the last week of June the experiment station rendered first aid at 8 fires within a few miles of the station.

California

H. W. Siggins was employed for part of the month. He will be appointed Junior Forester July 1. Mr. Siggins is a graduate of Mount Alto, taking his master's degree at the University of California. He stands first on the Junior Forester roll. He has had valuable experience since graduation which prepares him well for experiment station work.

The Stanislaus thinning and control plots were remeasured for the first time since establishment five years ago. The reproduction strips on the Cow Creek methods of cutting plot were also reexamined. Very few new seedlings were found, although there was a heavy seed crop last fall.

While on the Stanislaus Wieslander and Dunning accompanied a management crew for half a day, engaged in making a sample marking on the new Strawberry sale area. The object was to clarify modifications of marking principles as applied to white fir.

Forest Experiment Station Manuscripts Received

Appalachian

Natural Replacement of Blight-killed Chestnut in the Hardwood Forests of the Northeast. C. F. Korstian and P. W. Stickel. (J.A.R.)

Factors Controlling Germination and Early Survival in the Oaks. C. F. Korstian. (Yale Forest School News).

California

Predicting the Second Cut in National Forest Management Plans. Duncan Dunning. (To Jour. For.)

Progress Report: Method of Cutting Study - Sierra Forest. Duncan Dunning.

Progress Report: Method of Cutting Study - Tahoe Forest. Duncan Dunning.

Northeastern

Yields of Second-Growth Spruce and Fir. Walter Meyer. (Board of Review).

Pacific Northwest

Progress Report: Natural Reproduction Study, Columbia National Forest. L. A. Isaac.

Lake States

Possibilities of Scrub Oak Lands.

Yield of Jack Pine in the Lake States. A. E. Wackerman. (Board of Review.)

Growth of Understocked Stands of Jack Pine. A. E. Wackerman. (Board of Review).

Northern Rocky Mountain

Measuring Forest Fire Damage in Northern Idaho. G. T. Gisborne.

Study of Cut-over Areas in Western White Pine Type. I. T. Haig. (Preliminary Report).

How to Establish a Windbreak. W. G. Wahlenberg. (To Montana Farmer).

Forest Experiment Station Manuscripts in Print

Graham, S. A. The Fight on Forest Pests in the Lake States. (American Lumberman, May 22, 1926).

Haasis, F. W. The Decreasing Importance of Forest Grazing in the Southern Appalachian Region (Journal of Forestry, May, 1926).

Meyer, Walter H. Methods of Reading Multiple Quantities from Curves. (Jour. For. May, 1926).

Mitchell, J. A. Precipitation and Forest Fires in Northern Minnesota. (Jour. For., May, 1926).

Munger, T. T. Predicting Douglas Fir Crops. (The Forest Patrolman, June 15, 1926).

Osborne, W. B. & E. L. Wells. Weather and Forest Fires (Four-L Lumber News. May, 1926).

Show, S. B. Timber Growing and Logging Practice: California Pine Region. (U. S. Dept. Agr. Bul. 1402).

Simson, A. G. Research and the Forest Fighter. (Four-L Lumber News, May, 1926).

Wackerman, A. E. Earthworms in the Forest. (Jour. of For. April, 1926).

Westveld, M. Logging Damage to Advance Spruce and Fir Reproduction (Jour. For. May, 1926).

Forbes, R. D. What We Don't Know About Southern Trees. (Proc. La. Eng. Soc. December, 1926).

Gisborne, H. T. More Forest Inventions: Mechanical Short Cuts and Labor Savers Evolved by Uncle Sam's Foresters. (Am. For. and For. Life, June, 1926).

McArdle, R. E. How Fast Does Douglas Fir Grow? (Outdoors Pictorial, February, 1926).

Zon, Raphael. Engineering Aspects of Forestry. (Idaho Forester, 1926).

FOREST PRODUCTS

Washington

Cooperation - General Supply Committee

Mr. Helphenstine made inspections of three lots of lumber purchased under the supply schedule of the General Supply Committee. The first of these consisted of a shipment of white pine shop lumber, which was found to be in accordance with the material called for in the schedule. The second lot comprised a small quantity of cherry and quartered white oak. Half of this was rejected and the contractor was called upon to replace it. The third shipment consisted of white oak bridge plank. All of this material was rejected and the lumber which the contractor furnished in replacement was later inspected and found to be in accordance with the specifications.

Wood Preservation Statistics - 1925

In connection with this statistical compilation the following figures are of interest:

	1925	1924
Preservatives Used		
Creosote (Gallons)	167,642,790	157,305,358
Zinc chloride (Pounds)	26,378,658	33,208,675
Petroleum oil (Gallons)	13,048,539	11,179,346
Paving oil "	2,080,287	1,214,452
Miscellaneous "	331,591	473,207
Material Treated		
Crossties (cubic feet)	187,691,733	187,898,130
Piles " "	9,636,747	11,685,756
Poles " "	42,204,413	36,716,768
Wood blocks " "	3,408,489	4,191,560
Cross-arms " "	621,705	517,811
Construction timbers " "	27,992,452	24,291,231
Miscellaneous" "	2,918,999	3,281,979
Total	274,474,538	268,583,235

Miscellaneous

At the conference on the Seasoning and Handling of Lumber which was held in Chicago on June 4, under the auspices of the National Committee

on Wood Utilization, the remarks of Mr. R. R. Kittredge of the Fisher Body Corporation, Detroit, Mich., are of interest. In the course of his talk Mr. Kittredge stated that he knew nothing that the lumber industry could do just now to further its service to the automobile body manufacturer and reduce waste; and that in his opinion his company would continue to use wood in the manufacture of their automobile bodies. He further added that steel had not proven wholly satisfactory, and that it was his prediction that manufacturers of steel bodies would turn back to the use of wood. He also stated that at present the only good reason for using steel was to conserve lumber.

A representative of the Branch attended a meeting called by Mr. Oxholm, Secretary of the Utilization Committee to consider ways and means of collecting data on the amounts and sizes of wood-waste of various species available for sale at sawmills and wood-working plants in Virginia. Mr. Oxholm plans to enlist a number of officials and organizations in the project including the Governor, the Northern Pine Association, the Southern Furniture Association, farmers associations, the National Hardwood Lumber Association, the State Forester, the Pulp and Paper Association and others. At the meeting a questionnaire was worked out and arrangements made to distribute it through the Bureau of the Census.

DISTRICT 1

Wood Preservation

Efforts to increase the use of treated fence posts are apparently meeting with some success. There is a rather constant demand for information on this subject from local ranchers. Recently a retail lumber company which operates a number of country yards in Eastern Montana has become interested in the possibilities of treating local species for fence posts. The plan would be to handle these instead of the split cedar posts.

The use of treated lodgepole pine for telephone and power line poles by the Mountain States Telephone and Telegraph Company and the Montana Power Company has been discussed in past reports. During June, the Northern Pacific Railway Company has made inquiry along this line and has asked to receive information relative to suitable pole chances of this species on the National Forests.

Final arrangements for the post treating project at Miles City were completed during the month and Mr. Whitney is now engaged in the actual work.

1925 Lumber Census

The final shipment of schedules for North Idaho and Montana has been made. Three firms in South Idaho are yet to be heard from. Upon receipt of these, the preliminary news item for the two states will be prepared.

Lumber Prices & Movement

	Annual 1925	First Q. 1926	April 1926	May 1926
Idaho white pine	$37.37	$37.10	$37.33	$38.31
Western yellow pine	28.02	29.33	28.79	28.65
Larch-fir	19.33	19.33	18.33	18.13
White fir	20.14	19.79	19.88	19.57
Spruce	24.28	23.60	25.37	24.28

	May, 1926	May, 1925
Cut	166,148 M'	178,428 M'
Shipments	134,560 M'	149,615 M'

DISTRICT 5

(Delayed Report - April and May)

Direct or project work for the period reported on was much reduced by absence of personnel. Mr. Hill attended at the annual Products Program conference, from April 29 to May 24, while Anderson left on transfer to Montana April 30, and Mr. Brundage did not report till May 24. For over a week in April Hill was also engaged upon the District Training Committee.

California Economic Research Council

Mr. Hill attended a meeting on April 3 at the University of California in pursuance of plans launched at the previous Los Angeles meeting in February of local agencies engaged in economic or statistical research. Definite organization was perfected under the name California Economic Research Council, with an initial roster comprising over 150 such agencies. The objects of the Council are:

1. To provide a central catalogue of all research projects completed or being carried on by member agencies.

2. To survey the fields of economic and allied technical research and suggest to qualified member agencies projects designed to fill the gaps; as well as to reduce duplication as far as feasible.

3. To standardize statistical methods within the membership, so that results on similar subjects may be comparable.

For accomplishment of these objects five standing committees were set up, each under the chairmanship of a member of the Executive Committee of 15. Mr. Hill was made chairman of the Committee on Natural Resources. The Council will meet semiannually, the Executive Committee quarterly and the committees on call of their chairmen.

Major Uses of Wood

Mr. Hodge is making steady progress on this difficult project. One of the most enlightening things emphasized by recent work on this project is the utter unreliability of the statistics of commodities transported by the railways as supplied to the Interstate and State Commerce Commissions. They are so full of omissions, duplications and various inconsistencies as to be almost worthless for any serious purpose. However, by laboriously going back to original sources, possible through friendly contacts both at the State Railroad Commission and in the offices of some important railroads, much clarification and data of real value is emerging.

Lumber Census

Less than 25 pending cases remain as of May 31. While the Census Bureau tentative forecast for 1925 indicates a cut of some 10 per cent over that of 1924, the California returns, over 90 per cent in, now seem to indicate a cut for this State some 5 per cent under that of 1924. What may be the explanation of this is not yet clear. A very interesting and enlightening tabulation is being kept showing idleness, changes in ownership, etc., of mills by size classes.

DISTRICT 5 - JUNE

Forest Examiner M. R. Brundage has been getting his initial acquaintance with the work of the office. He devoted a good deal of time to cleaning up the Lumber Census work. This necessitated a trip to the redwood region, where the absence of any National Forests makes it impossible to get effective pressure upon census delinquents except by personal visitation.

To increase his familiarity with Products problems, Mr. Brundage used the opportunity to see as much as possible of such problems in the region covered. He visited a eucalyptus insulator pin factory to obtain wanted specific information, a charcoal kiln, a plant producing fiberized redwood bark, a recently established veneer plant, and several tenbark operations, besides discussing with several sawmills of the redwood industry the problem of longitudinal shrinkage in redwood, with reference to work upon it by the Forest Products Laboratory.

Retail Lumber Prices

The pressure which the Little Used Species work on white fir put upon this office for knowledge of retail prices led to the plan of keeping a graphic record of prices for selected grades, similar to that kept for mill prices. In the absence of any association record, we would have to get the retail prices from representative retailers. Several of these whom Mr. Anderson saw were favorable to the move. The secretary of the state retail association recently seen wet blanketed the whole thing, doubting the possibility of representative figures, or of getting the dealers to tell the truth, at least when business was poor and they begin to cut the prices of their competitors. Mr. Hill will see the President of the Association and representative members in the southern end of the state before accepting the pessimistic view of the secretary.

California Economic Research Council

Mr. Hill called a meeting of the Natural Resources Committee on June 9. A number of most interesting suggestions were made in respect to work which it is believed might profitably be fostered by the Council. These included the issue by the state or a state-wide agency such as the

California Development Association of revised publications embodying much new knowledge of the U. S. Weather Bureau and the Bureau of Soils, respectively, on the climate and the soils of the state; more adequate cooperative financing of the U.S.G.S. work in stream gauging; cooperative organization for more comprehensive and systematic annual spring snow storage surveys in the high Sierras, which are so vastly important to the irrigation and power interests of the state; the extension of soil surveys and mapping to the forest soils; bringing together the lumber industry of the state for agreement on compilation of the timber stumpage of the state. Mr. Hill also gave most of June 12 to the meeting of the Executive Committee of the Council.

Miscellaneous

During the month Mr. Hill addressed a meeting of the San Francisco chapter of the Am. Soc. of Mech. Engrs. on "What Forest Products research is doing for the engineer," and the Alameda County Floral Society on "The trees and forests of California;" besides which he read a paper of Mr. E. N. Munns of the Washington office before the Western Society of Naturalists, in connection with the meeting of the Pacific Division, A.A.A.S., at Mills College.

DISTRICT 6

Logging Utilization Study, Douglas Fir Region.--The survey of wood waste in logging within the Douglas fir region was carried forward on the lands of several cooperating companies during the month.

Two of the cutting areas examined were in National Forest timber sales. The results of these surveys have not been computed. The findings on one-acre plot, however, have been partially worked up. In this case a total of 26,000 board feet was left after logging. About 10,000 board feet were "first," "second" and "third" class logs (working plan classification). The balance was in the form of pulpwood, cordwood, shingle bolts, cedar poles, and posts. The original cruise of the timber ran about 84,000 board feet per acre. The yarding "side" on which this plot was located represented conditions which are worse than the average.

Two companies, the Long-Bell Lumber Company of Longview, Washington, and Bloedel-Donovan Lumber Mills in cooperation with James D. Lacey Timber Company, both of Seattle, Washington, have, on their own initiative, inaugurated utilization surveys on their logged-off lands. These private surveys are not as intensive as the Forest Service study and are more in the nature of checks scales, but their figures may be used if the Service so desires.

One Long-Bell survey covered an area of 40 acres and showed that 5,339 board feet of small logs was left on an average acre. By "small logs" is meant a minimum diameter of 13 inches and a minimum length of 10 feet. S. M. Morris of the Long-Bell Lumber Company said, "This company is very much interested in disposing of its small chunks and logs at a profit. We hope to dispose of some of this material to a kraft paper pulp mill recently constructed across the Columbia River at St. Helena. I hope you will keep this in mind during your survey and if you can present any helpful suggestions regarding the disposal of small logs they will be greatly appreciated." In preparation of such a waste disposal the Long-Bell logging superintendent has originated and drawn up plans and specifications for a light, portable skidder and loader, with which he claims he can yard and load the small logs at a comparatively low cost.

One factor making itself apparent, which may lead to inconsistent conclusions, if not given due consideration: the matter of management. A keen, active manager, who is finding and making a market for all the products of his camp, though operating conditions may be adverse, will realize closer utilization than camps having seemingly more favorable conditions but a poor manager.

Measuring the sample plots is slow and tedious work, but this is partially offset by the interest and enthusiasm shown by members of the lumber industry.

Air-Seasoning Study.--Messrs. Johnson and Gibbons both spent considerable time in the preparation of the report dealing with air-seasoning in the Douglas fir region, Mr. Johnson also spending some time in the field on this study, during which he visited the plant of the Standard Seasoning Society at Cottage Grove, Oregon. This company is seasoning 2-inch and 3-inch bridge planking by what they term the "cold-seasoning" process. General information suggests that the process is giving excellent results in the way of satisfactory underweights and small amount of degrade. Moreover, it has aroused considerable interest, offering a possible solution of difficulties encountered in drying wide and thick clear stock, and the common grades of fir.

The building in which the "cold-seasoning" process is carried on is 700 feet long, 40 feet wide and 42 feet high. When filled it will hold on an average of 2,000,000 feet of planking. The building is entirely enclosed excepting a slot about two feet high across each end, through which the lumber is passed. The circulation may be controlled by means of two rows of windows, one at about one-third the wall height and the other near the eaves, each row extending the full length of the building; there are also openings in the floor and roof.

The house is divided into 32 sections, each section containing a battery of slots. The crosser-like pieces forming the slots are supported from the roof beams and can be adjusted to accommodate any thickness of stock from one to six inches and lengths up to 32 feet.

The seasoning is accomplished entirely by means of natural circulation, which can be increased or decreased by opening or closing the windows or the openings in the floor and roof. It is claimed that by this process lumber can be seasoned faster and with less degrade than in open yard piles. Another claim is also made, that the stock turned out is softer than by the usual air-seasoning or kiln-drying process.

With the process offering a possible solution to certain seasoning difficulties and with some of the larger lumber manufacturers interested, arrangements have been made to study it as a part of the general air-seasoning study. This will be carried on in cooperation with the Booth-Kelly Lumber Company of Eugene, Oregon, the West Coast Lumbermen's Association, and the Standard Seasoning Society of Cottage Grove. This will be confined, for the present, to clear grades of Douglas fir, one, two, three and four inches in thickness and eight, twelve and sixteen inches in width.

Cooperation Extended Postoffice Department.-- During the past several months this office has cooperated with the Postoffice Department by inspecting airplane spruce cut at Bellingham, Washington.

The original order called for 24,000 board feet of 3x8", 4x8", and 4x10" stock 26 feet long and 6,000 board feet of 5x6" 16 feet long. The company started cutting this order in October. Since that time Mr. Johnson has made four trips to Bellingham, each time the company presumably having sufficient stock cut to complete the order. To date Mr. Johnson has inspected approximately 125,000 board feet and accepted

18,000 feet. The main difficulty in securing the stock desired lay in the lengths required. Some of the stock rejected would have cut out suitable stock of shorter lengths.

Considerable effort was expended by the company in getting out this order; the logs being specially selected and the material inspected in lengths up to 42 feet in an endeavor to get the desired cuttings. The fact that the logs from which the stock was cut came from the Olympic Peninsula where the stands of spruce are in general of better quality than in any other part of its range, indicates the increasing difficulty of securing spruce airplane stock in long lengths. The order in question was placed with difficulty; operators specializing in spruce airplane stock refused to even consider it.

New Assignment.--Mr. Alexander Koroleff, the newest member of the Portland office of Products, will report for duty July 1. Graduated from the Imperial Forest Institute of Petrograd in 1913 with the degree of Scientific Forester (equivalent to M.F.), and after serving in the Siberian Forest Service, Mr. Koroleff was sent to this country to study wood utilization methods, particularly as related to the woods. Revolution at home forcing a change in plans, he took steps to become an American citizen. After getting considerable practical experience in the logging and lumbering operations of the Douglas fir region, he attended the University of Washington, taking an M. F. degree. From the West he traveled on to the Lake States and New England. This was followed by two years post-graduate work as Research Fellow at Yale. During the past year he not only served as an instructor at the School of Forestry, University of Minnesota, but conducted a utilization study at the Lake States Forest Experiment Station under the direction of Director Zon.

FOREST ECONOMICS

Research on Tropical Woods

The Forest Service has been asked to assist the Tropical Plant Research Foundation in a preliminary investigation into the possibility of using tropical woods in American industries. This project has been undertaken by the Foundation at the request of the Wood Industries Division of the American Society of Mechanical Engineers, which has granted a small appropriation for the purpose and may decide to finance a more comprehensive study if the preliminary survey indicates that it is worth while.

In this connection, the following information gleaned from consular reports within the past few days is of interest:

1. In 1925, the United States imported 700 tons of willows from Argentina.

2. French imports of tropical woods for the first 4 months of 1926 were 64 per cent greater than for the same period in 1924; from January to April, 1924, tropical woods comprised 12 per cent of the volume of all wood imported, and in 1926 the proportion rose to 19 per cent.

3. The American consul at Berlin reports, "South American and Central American countries as well as Africa are now supplying many kinds of woods .... which are today being largely used in place of the expensive North American varieties."

4. The American consul at Frankfort reports that the quality of American lumber reaching that district is much inferior to the pre-war importations, especially in the case of oak and walnut.

New Forest Law of Mexico

Mexico's forest law, which became effective June 24, creates forest reserves of all the unappropriated forest land and all forest land that may later be acquired by the Federal Government or the individual States, and puts them under control of the Department of Agriculture. The Department is also to regulate the exploitation of communal or common forests and private forests. Private owners must re-establish forest growth on cut-over lands, while the Federal Government or the States may expropriate land to reforest it. The Department is to establish nurseries to provide planting stock, and is to carry on scientific investigations in forestry. Owners of forests, handled according to an approved working plan, are exempted from taxes until the timber is cut, and the land itself is exempted from Federal tax in the case of plantations. After one year it is forbidden to use railroad ties, poles, posts, or mine props that have not been treated with preservative. It is also provided that any industry using wood must utilize it completely, without waste.

New Material for Statistical Bulletin

Progress of the statistical bulletin on its way to the Editors and the printers has been postponed for more than six weeks owing to the introduction of State and other tables not previously contemplated for publication with the national statistics. The number of new tables is 61, among which are 44 which show lumber production by States and species from 1899 to 1924.

There are also six species tables showing the production of oak, yellow pine, Douglas fir, western yellow pine, white pine, and hemlock by States from 1899 to 1924. Previous to 1899 there was no segregation of species by the census.

Other tables included are:

Areas of the United States, classified by economic uses.

Areas, forest, original and present, by States.

Wood distillation, principal products.

Rayon production, United States.

Damage from action of insects, on timber and forest products.

Damage from action of fungi on timber and forest products.

Turpentine and rosin production, United States, trade estimates.

Fuelwood, consumption and production estimates.

Fence posts, consumption and production estimates.

Lumber distribution, freight bill of the United States.

The latter table in particular requires extensive computation. It is a natural by-product of the lumber distribution study. Since we have the quantities of lumber distributed within each State and from each region to each State, it is possible to multiply by suitable freight rates, making allowances for the water hauls, and get the freight bill for each State, external and internal, and a total bill for the United States.

Care has been taken to secure shipping weights which should represent as closely as possible the actual average weight of the hardwoods and softwoods shipped from each region. Here it is necessary to weigh for the percentages of the cut shipped in different conditions of dryness and thickness, and also for species.

For southern pine excellent basic material for computation of weights was found in the 1924 statistical report of the Southern Pine Association. For Douglas fir and other western species the average weights resulting from normal development of the log were reported by C. C. Koerner of the Weyerhaeuser Timber Company, Spokane.

The average weights resulting are of interest on account of their lightness relative to the weights per cubic foot quoted by the Laboratory. This shows the effectiveness of the dry kiln and also the struggle to reduce weights which is going on in the rivalry between western and southern lumber. Some of the weights used are as follows:

Southern yellow pine	2650	Oak	4000
Douglas fir	2600	Beech	4000
Western yellow pine	2100	Birch	4000
Western white pine	1900	Maple	3800
Western spruce	2300	Gum	3300
Western cedar	2300	Yellow poplar	2800
White fir and larch	2400	Elm	3800
		Ash	3600
		Hickory	4500

Regional Averages

Southern softwoods	2635
Northern and central softwoods	2105
Pacific North softwoods	2470
Pacific South softwoods	2155
Rocky Mountain softwoods	2170
Northern and Lake hardwoods	3680
Central hardwoods	3665
Southern and N. C. pine hardwoods	3490

FOREST TAXATION INQUIRY

The Forest Taxation Inquiry continued to devote itself to work of a general and preliminary character in New Haven during the greater part of June. The furnishing of Marsh Hall was completed. Professor Chapman reported for active duty on June first. Professor Herbert reported for duty on June 15 at Lansing, Michigan, and devoted the remainder of the month to making certain studies in the State of Michigan, with instructions to report at St. Paul on July first.

Fairchild went on June 13 to Charleston, West Virginia, where he attended and addressed a joint conference of three State Commissions, namely, the Conservation Commission, the Tax Commission, and the Revision and Codification Commission, Governor Gore presiding. There was evidence of considerable interest in reforestation and forest taxation, as well as other problems of conservation and taxation.

At the end of the month, the Inquiry moved bodily from New Haven to Minnesota, this State having been chosen, after careful consideration of the claims of various regions, as the arena for the first field study. The members of the staff arrived at St. Paul on June 30. Steps were taken at once toward establishing State headquarters at University Farm in rooms furnished by the State University in close proximity to the Lake States Forest Experiment Station.

GRAZING RESEARCH

Washington

The Grazing Research Washington Program for 1926 was one of the big jobs during the month. This program will be mimeographed and forwarded to all interested parties. In preparing the program endeavor was made to show briefly the main results of experiments now under way and the general plans for the future.

An exhibit of grazing and erosion particularly as developed by the Great Basin Experiment Station is being constructed in the Office of Exhibits and will be available for use at State Fairs.

The Office of Motion Pictures has agreed to take a motion picture of National Forest range management on the Humboldt. At the time the photographing is to take place a cooperative range inspection through northern Nevada will be conducted by the County Agent of Elko County and Supervisor McQueen of the Humboldt National Forest.

The Carnegie Institution plans to transfer its studies of propogation of exotic plants from the Yosemite National Park to the National Forests of the Sierras. This will give the Forest Service an excellent opportunity for cooperation in a project which may prove very valuable for the improvement of range lands. Dr. John C. Merriam has been assured of our interest and willingness to cooperate.

Publications

The galley proof of bulletin 1405, "Grazing Periods and Forage Production on the National Forests," by A. W. Sampson and H. E. Malmsten, has been completely checked and returned to the Government Printing Office.

The following manuscripts have been received during the month:

Important Western Browse Plants. W. A. Dayton. (Revision).

The Relation of Herbaceous Vegetation to Surface Run-off and Erosion on High Mountain Watersheds. C. L. Forsling. (Revision).

Range and Livestock Investigations on the Santa Rita Range Reserve. M. J. Culley. (First Draft).

SANTA RITA RANGE RESERVE

Personnel

On June 8 Mr. Griffith, Assistant on the Reserve, left to take up his new work as Boy Scout Executive at Kirksville, Missouri.

On June 16 Mr. Warren V. Turner, Forest Ranger on the Sitgreaves, was transferred to the Reserve as Junior Range Examiner and arrived on the nineteenth to assume his new duties. He is expecting his family to join him shortly from Fort Sumner, New Mexico, where they have been visiting for the past month. Mr. Turner comes to the Reserve well fitted for the work, having had considerable ranch and stock handling experience together with a year as Forest Ranger on the Sitgreaves Forest. He is a graduate of the Colorado Agricultural College where he assisted with investigative work and did some teaching in the Botany Department. He passed the Junior Range Examiner examination last year.

Mr. Griffith's sudden departure made it highly desirable to have Mr. Turner on the ground as soon as possible so that he could become familiar with the work before the active field season set in, and we greatly appreciate Supervisor Roberts' ready response to our request for the transfer on such short notice to us.

Visitors

Mr. E. Mortensen, Assistant Entomologist for the Australian Government and located at Uvalde, Texas, paid one of his many visits to the station on June 23, for the purpose of observing certain insects which are destroying the prickly pear cacti in this vicinity. His chief aim seems to be one of destructiveness rather than improvement which is ordinarily the outcome of investigative work. However, indirectly he is working toward the same goal as the rest of us, for by destroying cacti he hopes to enable the growing of more valuable species on the lands of Australia. Any agents that show possibilities in the way of destroying cacti are collected and given a thorough tryout at the experiment station in Uvalde. Here their effectiveness in destroying the cacti is carefully studied as is also their effect upon other forms of vegetation. What he wants is something with a very selective appetite for cacti species to the exclusion of all other forms of vegetation.

Range and Stock Conditions

The range has held up very well despite the excessively dry weather through June and most species of perennial grasses have remained green throughout. Annual growth has completely dried up while browse species have been out in full leaf for the past three weeks and have furnished a large proportion of forage eaten by stock. Stock of all ages and classes continue in excellent condition.

Climatic and Rainfall Conditions

The early part of the month though showing a rise in temperature was not excessively hot (for desert rats at least), however for the past ten days the thermometer has ranged from 98 to 103 during a good share of each day, and, to say the least, has left much to be desired in the way of comfort.

Light showers occurred on the 6th, 27th, and 29th, the latter two bringing considerable relief from the hot spell just preceding. Summer rainfall indications are promising and we're waiting for the Fourth of July for them to materialize. Haven't planned anything for the Fourth except work so that we won't be disappointed if it rains all day.

Station Improvements

Construction work on improvements at Florida Station is coming along in fine shape and very shortly we hope to have a new barn and storage cellar completed, both of which will fill a long felt need at the Headquarters.

GREAT BASIN EXPERIMENT STATION

The Weather

June was very dry with only a little over one-third the average precipitation for the month. Range forage dried badly the last two weeks and the deficient moisture has tended to force early flowering of both grasses and weeds in the lower zones. Height growth and volume of foliage produced, however, was below average. This condition has followed in the wake of 1925 in which year June was wetter than usual and forage growth was exceptionally good. Past observations indicate that June is the critical month of the season and that average or above rainfall in that month insures a good forage crop for the year.

Study of Browse Range

The study of natural revegetation and degree of utilization study was extended this month to include the snowberry (Symphoricarpos oreophilus) sagebrush type. Major plots were established on protected range, closely grazed range, and within a hurdle enclosure (enclosure with removable fence to obtain any desired control of grazing). In addition a number of plants of snowberry were tagged for growth measurements and to determine the effect of different degrees of use. Other browse species already being studied include birchleaf mahogany (Cercocarpus montanus) and bitter brush (Purchia tridentata).

The experimental pasture on browse range on the Dixie Forest is being allowed to "rest" this year in preparation for the starting of an intensive carrying capacity study next year.

Root Storage Studies

A start has been made this year to obtain some more definite information on the time of food storage in the roots of a number of representative forage grasses. For a long time it was considered that close grazing after seed maturity caused no injury to range grasses. A test carried on for five years, in which grasses were allowed to mature their seed and were then clipped quite close to the ground at various intervals until the close of the growing season showed that such treatment was injurious. Both species of grass used, violet wheat grass (Agropyron violaceum) and Nevada bluegrass (Poa nevadensis) declined in vigor and yield from year to year. The question arose as to whether there was some physiological response to the close clipping or whether the removal of the aftermath permitted some physical injury to the plant by unduly exposing the growth producing portions to the weather. Root samples will be collected of several species at different stages of development of the plant, for chemical analysis, to obtain data on the time when storage of starch and other foods takes place in the root, and whether very close grazing in the fall interferes with such storage. The species being collected include large mountain brome grass (Bromus polyanthus), needle grass (Stipa lettermanii), and violet wheat grass (Agropyron violaceum).

Studies at the U. S. Sheep Experiment Station

Forsling spent May 31 and June 1 assisting in carrying out the program for the eighth annual Field Day at the U. S. Sheep Experiment Station near Dubois, Idaho. About 65 visitors were in attendance, including stockmen and men interested in range management and sheep breeding, from various State institutions. State men from Wyoming, Utah, Montana, Oregon, Idaho and Nevada were present. Special attention was given at this meeting to the range studies being conducted at the Station in cooperation with the Great Basin Experiment Station and the U. S. Sheep Experiment Station of the Bureau of Animal Industry. These studies, which were started in 1923, are of special interest because they represent the only place in the Intermountain region where typical sagebrush-grass, spring-fall range is being studied. The Sheep Station is equipped with ten small pastures or paddocks, each of which is being grazed to obtain information on some problem involved in the use of spring-fall range. The paddocks make it possible to carry out each test on an actual grazing basis. Special attention is being given to the "too early use" problem and effort is being made to determine the application of some system of rotation in spring use which may relieve the situation for finding range for livestock between the time the animals should be removed from the feed lots or desert range until the spring range can be used without injury. The results to date already indicate the injurious effects of too early use in the spring and the utility of the deferred and rotation system of grazing on spring-fall range in much the same manner as for the high mountain summer range.

JORNADA RANGE RESERVE

Range Conditions

Range conditions during the month have continued very favorable as a result of the heavy precipitation which occurred quite generally over the reservation during the last week in May. The growth of Spring annuals has for the most part dried up, but perennial grass growth is well under way, with several of the important species heading out. The crop of Soapweed flower stalks which are in full bloom at the present time is very heavy and more prolific than usual. Prospects for an excellent forage crop this season are good if rains continue.

Rodent Control

This office was informed under date of June 3, by Mr. A. E. Gray, leader of rodent control for the U. S. Biological Survey at Albuquerque, that plans are now under way for a second intensive treatment of that portion of the Reserve which is infested with kangaroo rats. This area which covers approximately 75,000 acres, was treated by the U. S. B. S. in 1923, with poisoned grain. The operations this year will be carried on in October and November.

Precipitation Data

Four new rain gauge enclosures were constructed this month, which will be used for precipitation stations as soon as the necessary rain gauges are secured.

Handling Stock

The first shipment of cattle which are to be grazed on the Reserve under the new agreement, arrived in good shape on June 12. The shipment consisted of 618 cows, 34 bulls and 299 calves; the latter being the natural increase of that many cows. With the exception of the bulls, these cattle are of the old familiar T-Hook brand, which were the property of the former cooperator. Needless to say these cows are of good Hereford characteristics and will make a good foundation for the future Jornada herd. The bulls are good lot, pure bred with plenty of scale and bone. Most of the dry cows received are springers so a good calf crop should be tallied out this fall when branding takes place.

Vegetative Studies

The Black grama period study was put in operation the 18th of June, the first of a series of six enclosures having been opened on that date.

The Palatability Study on grazed plots was begun on June 19.

A new series of Aristida quadrats was established in the field in Pasture No. 2, the latter part of the month. This is the first of a series of pure Aristida quadrats to be established on the Reserve and some good data should be forthcoming from this series of plots in the future.

Personnel

Mr. Roy H. Canfield reported for duty on June 25, having been appointed as Junior Range Examiner from this year's register. He is a graduate of the University of Montana xxx Forest School and for the past two field seasons has been employed in District one on the range reconnaissance and subsequently as assistant to Mr. McGinnies on range investigations.

Range Improvements

The Cooperator has begun the construction of two steel storage tanks at South Well and Stewart Well for stock water. These tanks will be of 60,000 gallons capacity and will be supplemented with circular steel tubs of approximately 4,000 gallons capacity in order to water the stock.

DISTRICT 3

Activities during the month of June have been centered on revegetation, erosion and browse utilization phases of the brush range project and on the compilation of field notes.

Cooperrider has spent the month in the District Office; Copple has been in the field in the vicinity of Roosevelt Dam on the Tonto National Forest.

Some progress has been made in assembling notes toward a satisfactory basis for analysis of past work at the close of the year.

In the ten-acre fenced enclosure on the Crook Forest bench marks were established for permanent tees, two quadrats were laid out and mapped, twenty erosion stations were established. Erosion stations consist of iron pipes set in concrete in a manner enabling vertical measurements to be made from a piano wire stretched between stakes.

Two quadrats were laid out and mapped in one of the enclosures on the Forest near Payson. Examination of some of the Tonto Forest Ranger Station pastures was made in drawing comparisons between different degrees and kinds of range use, and in determining the vegetative make-up of associations under partial protection.

Observations were made at different points from the semi-desert through the oak belt on the utilization of browse species at this period. Copple reports that "cow diatetics in the browse regions of the Southwest, where most everything has a thorn and generally more, is immensely interesting to say the least."

Cooperrider has made a rough compilation of the data available and field notes on the Roosevelt Dam and its watershed dealing with exposed geological formations, soils, erosion tendencies; also methods of deposit and character of detritus in the exposed lake bed as an accumulative record to be correlated with the results of grazing research in the region.

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DISTRICT 6

The entire time during the months of May and June was spent by Ingram on the project "Grazing Management of Cut-over Areas." The first half of May on the Columbia Forest in re-examination of the study, principally in rechecking the balance of the 88 chain transect.

Compilation of last season's survival and losses of coniferous seedlings were then made. This showed for the area as a whole seedling survival of 71.6% for all ages and species. By species and age classes the survival is as follows:

	Douglas Fir					Hemlock					Cedar & others		
Germ Year	25	24	23	22	21	20	25	24	23	22	21	25	24	Older
Survival %	50	66	84.2	91.2	100	100	71.1	85.1	100	100	100	86.4	100	88.9

The latter part of May and first half of June were spent on the Siskiyou and Crater Forests, assisting in recheck work on minor assignments of the project to these Forests.

Returning to the Columbia June 21 to 26 for periodical vegetative study, the last four days in June were spent on compilation work and progress report on this project. Fifty lambs were marked and weighed in the study band on the Columbia and will be re-weighed when the sheep leave the cut-over range, and again at the end of the season to test average gains made on unseeded cut-over areas.